IN THE DESCRIPTION

Rewrite the two paragraphs starting on page 15, line 20, as follows:

A1

Bayesian networks are directed acyclical graphs (DAG) in which the nodes correspond to (stochastic) variables. The arcs describe a direct causal relationship between the linked variables. The strength of these links is given by conditional probability distributions (cpds). More formally, let the set ~~A (_1,...,_N)~~ $\underline{\Omega\{x_1, \ldots x_N\}}$ of N variables define a DAG. For each variable $\underline{x_i}$, $\underline{i=1,\ldots,N,}$ there exists a sub-set of variables of Ω, ~~9_i~~ $\underline{\Pi_{xi}}$, the parents set of ~~_i~~ $\underline{x_i}$ i.e., the predecessors of ~~_i~~ $\underline{x_i}$, in the DAG, such that ~~P(_i | 9_i) = P(_i | _1, ..., _i-1)~~ $\underline{P(x_i \mid \Pi_{xi}) = P(x_i \mid x_1, \ldots, x_{i-1})}$, where $P(\cdot|\cdot)$ is a cpd, strictly positive. Now, given the joint probability density function (pdf) ~~P(_1, ..., _N)~~ $\underline{P(x_1, \ldots x_N)}$, using the chain rule: ~~P(_1, ..., _N) = P(_N | _N-1, ..., _1) x ... xP(_2 | _1)P(_1)~~ $\underline{P(x_1, \ldots x_N) = P(x_N \mid x_{N-1}, \ldots, x_1) \times \ldots \times P(x_2 \mid x_1) \times P(x_1)}$. According to this equation, the parent set ~~9_i~~ $\underline{\Pi_{xi}}$ has the property that ~~_i and {_1, ..., _N}\N_i~~ $\underline{x_i \text{ and } \{x_1, \ldots, x_N\}\backslash\Pi_{xi}}$ are conditionally independent given ~~9_i~~ $\underline{\Pi_{xi}}$.

In FIG. 4, the flow diagram of the BE has the structure of a DAG made up of three layers. In each layer, each element corresponds to a node in the DAG. The directed arcs join one node in a given layer with one or more nodes of the preceding layer. Two sets of arcs join the elements of the three layers. For a given layer and for a given element we compute a joint pdf as previously described. More precisely, for an element (node) $i^{(l)}$ associated with the l-th layer, the joint pdf is:

$$\cancel{P^{(l)}(\_^{(l)}_{i(l)}, 9^{(l-1)}, \ldots, 9^{(2)}) = P(\_^{(l)}_{i(l)} \mid 9^{(l)})}$$

$$\times \cancel{\{P(\_^{(l-1)}_1 \mid 9^{(l-1)}_1) \ldots P(\_^{(l-1)}_{N(l-1)} \mid 9^{(l-1)}_{N(l-1)})\}} \ldots$$

$$\times \cancel{\{P^2_1 \mid 9^2_1) \ldots P(\_^2_{N2} \mid 9^{(2)}_{N2})\},} \qquad \cancel{(1)}$$

A'

$$P^{(l)}(x^{(l)}_{i(l)}, \Pi^{(l-1)}, \ldots, \Pi^{(2)}) = P(x^{(l)}_{i(l)} \mid \Pi^{(l)})$$

$$\times \{P(x^{(l-1)}_1 \mid \Pi^{(l-1)}_1) \ldots P(x^{(l-1)}_{N(l-1)} \mid \Pi^{(l-1)}_{N(l-1)})\} \ldots$$

$$\times \{P(x^2_1\ \Pi^2_1) \ldots P(x^2_{N2} \mid \Pi^{(2)}_{N2})\}, \qquad (1)$$

where for each element $\cancel{\_^{(l)}_i}$ $x_i^{(l)}$ there exists a parent set $\Pi_i^{(l)}$, the union of the parent sets for a given level l, i.e., $\cancel{9^{(l)} \overset{(def)}{=} \cup_{i=1}^{N(l)} 9_i^{(l)}}$ $\Pi^{(l)} \equiv \sum_{i=1}^{N(l)} \Pi_i^{(l)}$. There can exist an overlap between the different parent sets for each level.